Abstract of Concurrent Session Presentation

Symbiotic exception: The Nod-independent interaction between the Aeschynomene legumes and photosynthetic Bradyrhizobia

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There was a long-held dogma that the synthetised of Nod factors (NF) by rhizobia was absolutely required to trigger nodule organogenesis in legume. However, the universality of the NF paradigm was recently overturned, by the finding that the genome of two photosynthetic Bradyrhizobium strains (BTAi1 and ORS278) that elicit root- and stem-nodules on a particular group of Aeschynomene plants do not contain the canonical nodABC genes necessary for the synthesis of NF (Giraud et al. 2007). To obtain further insight into the bacterial genes involved during the early steps of this NF-independant symbiosis, we have screened a large Tn5 mutant library of the Bradyrhizobium ORS278 strain for their inability to induce nodules on Aeschynomene. No strict nodulation deficient mutants were found. However, several mutants affected in the different steps of the purine biosynthesis pathway were severely impaired in nodulation. This suggests that a bacterial purine derivative such as cytokinin, may play a key role in triggering nodule formation on Aeschynomene. A number of independent observations support such a hypothesis. First, we have found that photosynthetic bradyrhizobia are able to synthesize cytokinins and, second, we observed that the exogenous addition of certain pure cytokinins could induce the formation of nodule-like structures. At the plant level, experiments are in progress to determine whether the NF-independent signaling pathway in Aeschynomene plants share common elements with the NF-dependant symbiosis as described in the model legumes. In my talk I will give an overview and present recent advances in the Nod-independent symbiosis between photosynthetic bradyrhizobia and Aeschynomene.